

## ABSTRACT OF THE DISCLOSURE

The present invention provides a method for producing a membrane-electrode structure having an excellent adhesiveness between an electrode catalyst layer and a diffusion electrode, and a polymer electrolyte fuel cell using a membrane-electrode structure obtained by the production method. Moreover, it also provides an electrical apparatus and a transport machine that use the above polymer electrolyte fuel cell. A catalyst past comprising a catalyst supported by an electron conducting material and an ion conducting material is applied on a sheet substrate 2, and it is then dried, so as to form electrode catalyst layers 3, 3. The electrode catalyst layers are thermally transferred onto each side of a polymer electrolyte membrane 1, so as to form a laminated body 4. A first slurry comprising a water-repellent material and an electron conducting material is applied on a carbon substrate layer 6, and it is dried to form a water-repellent layer 7, and then, a second slurry comprising an electron conducting material and an ion conducting material is applied on the water-repellent layer 7, and it is dried to form a hydrophilic layer 8, so that a diffusion electrode 5 is formed. The previously formed diffusion electrode 5 is laminated on the electrode catalyst layer 3 through the hydrophilic layer 8, and they are then pressed under heating, so as to integrate the laminated body 4 and the diffusion electrode 5.